

What Is Claimed Is:

1. A water spray head for spraying water spray mist in a fire prevention system, comprising:

a water supply duct(1);

a spray head upper body (2); a fluid chamber (3); and

a “w” shaped bottom (4), on which at least two rings of nozzles (6, 8) are installed.

2. The water spray head as in claim 1, wherein the at least two rings of nozzles include an outer ring (8) and an inner ring (6), the nozzles installed on the outer ring (8) are pointed outward and downward and the nozzles installed on the inner ring (6) are pointed inward and downward.

3. The water spray head as in claim 1, wherein the spray head produces finer water mist spray than each individual nozzle.

4. The water spray head as in claim 1, wherein water mist sprays from the inner ring of nozzles (6) collide with each other (15) to produce finer water droplets (16), thereby improving fire suppression efficiency.

5. The water spray head as in claim 4, wherein the nozzles on the inner ring (6) are installed with a tilt angle ( $\gamma$ ) so that the spray mist from the inner nozzle collides tangentially.

6. The water spray head as in claim 5, wherein a downward water mist nozzle (7) is installed on a face (12) of the spray head bottom (4).

7. The water spray head as in claim 1, wherein the water spray head has a “solid cone” spray pattern regardless of the spray pattern of each individual nozzle.

8. The water spray head as in claim 1, wherein the nozzles are assembled with the spray head by a thread screw connection (9).

9. The water spray head as in claim 8, wherein the nozzles can be easily replaced using new nozzles instead of a whole spray head when a potential fire scenario changes.

10. The water spray head as in claim 1, wherein some of the nozzles are installed with a stop, depending on the potential fire scenario.

11. A water mist nozzle of a water spray head for generating water mist, comprising:

a cylindrical body (7);

a channel (20) at a discharging end (22) along an axis of the water mist nozzle; and

a plurality of channels at an inlet end (19) of the water mist nozzle, including a central small channel (24) and side slant channels (23), the channel (20) at the discharging end (22) being larger than the plurality of channels at the inlet end (19).

12. The water mist nozzle as in claim 11, wherein liquid flowing from channels (23, 24) at the inlet end (19) converge into the channel (20) at the discharging end (22).

13. The water mist nozzle as in claim 11, wherein the water mist is formed due to collisions of water jets from the channels (23,24) at the inlet end colliding with each other at the channel (20) at the discharging end, droplet collisions on a channel wall (25) and the effect of pressured jet through a small orifice.

14. The water mist nozzle as in claim 11, wherein a series of water nozzles with different performance and mist characteristics designed by varying the design parameters  $D_1$ ,  $D_2$ ,  $D_3$ ,  $H$ ,  $h$ ,  $\eta$ , and so on.

15. The water mist nozzle as in claim 11, wherein the nozzles are assembled with the spray head by a thread connection (9).

16. The water mist nozzle as in claim 19, wherein the nozzles can be easily replaced using new nozzles only instead of a whole spray head when a potential fire scenario changes.

17. The spray head as in claim 1, wherein the water mist nozzles to be installed are not necessary limited to the nozzles as in claim 11. Other type nozzles may also be able to be installed on the spray head under the light of this invention's spirit.

18. The connection method between the spray head and nozzle as in claim 8 and 15, wherein the connection method is not necessary limited to thread/screw connection. Other connection method may also be used for the purpose of tight connection with easy installation/maintenance.